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**Craig, A., Y., Charles Evans & Associates XPS/ESCA  
Results, CE&A Number 44545, November 3, 1994**

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# CHARLES EVANS & ASSOCIATES

SPECIALISTS IN MATERIALS CHARACTERIZATION

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COMPANY: Hydrocatalysis Power  
 ATTENTION: Stev Bollinger  
 DESTINATION  
 FAX NO: (610) 651-4940  
 FROM: Dr. A.Y. Craig  
 SUBJECT: XPS/ESCA Results (CEA #44545)

REF NO: G9942

DATE: November 3, 1994

PAGE 1 OF 7

CE&A REPLY FAX  
 NO: (415) 369-7921

Please find attached typical results for your samples. A 2 mm x 0.8 mm analysis area was selected for this work.

Elements C, O, N, Si, Cl, S, Ni, Zn, Sn, K, Ca, Mg and Cr are detected at the surface for the Nickel Cathode Sample #A. The concentration for C is approximately 52 at%, while that for Ni is approximately 9 at%. The concentrations for Ca (approximately 0.1 at%) and Mg (approximately 0.2 at%) are considered maximum values due to the noisy spectra.

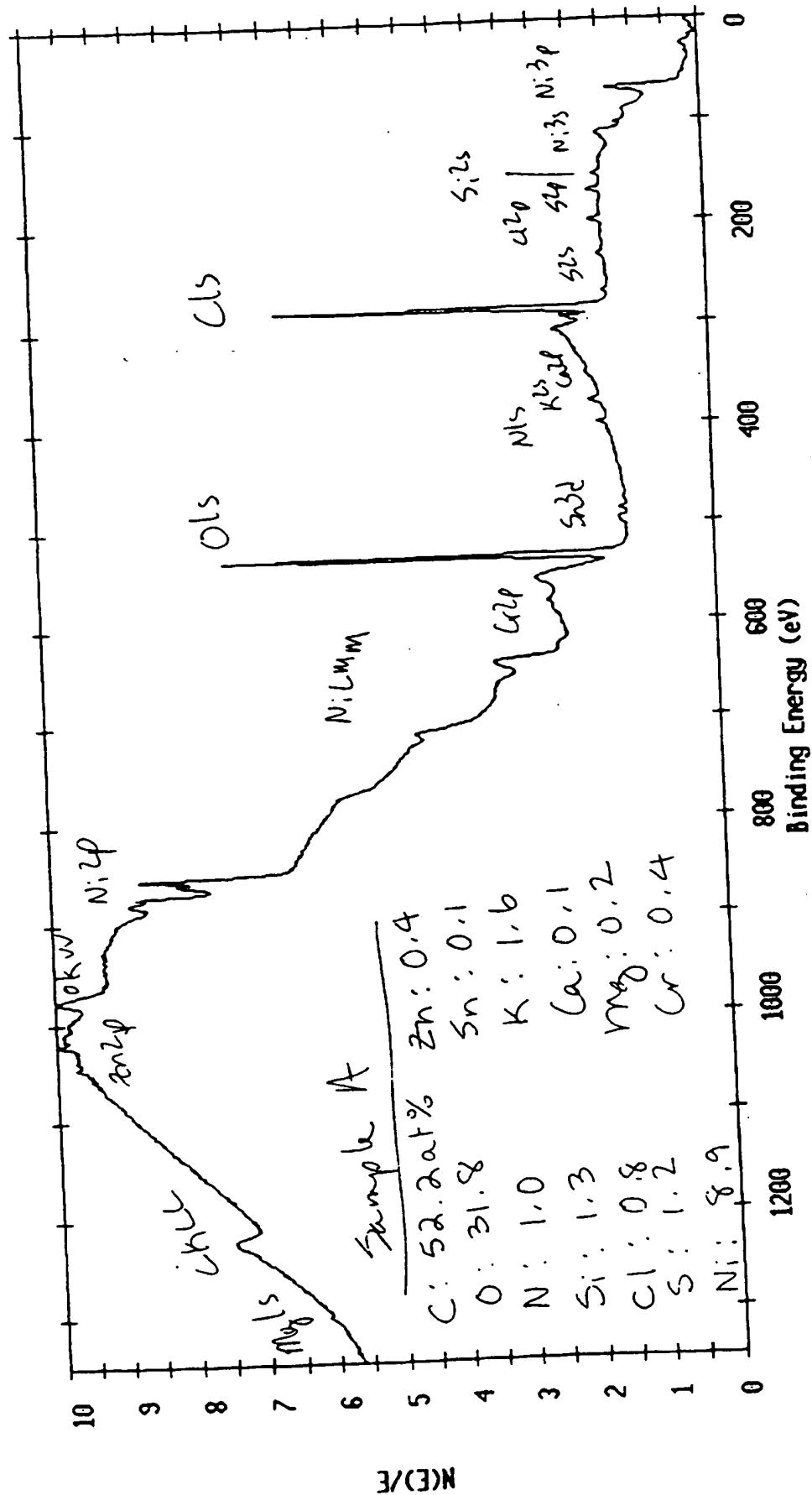
Elements C, O, N, Si, S, Ni, Zn, Sn, Mg and Cr are detected at the surface for the Nickel Cathode Sample #B. The concentration for C is approximately 41 at%, while that for Ni is approximately 13 at%.

This analysis involved approximately 8 hours of instrument time. You will be invoiced for 6 hours (\$1800.00), as quoted. If you have any questions regarding this work, please call me.

Sincerely,

Angela Y. Craig

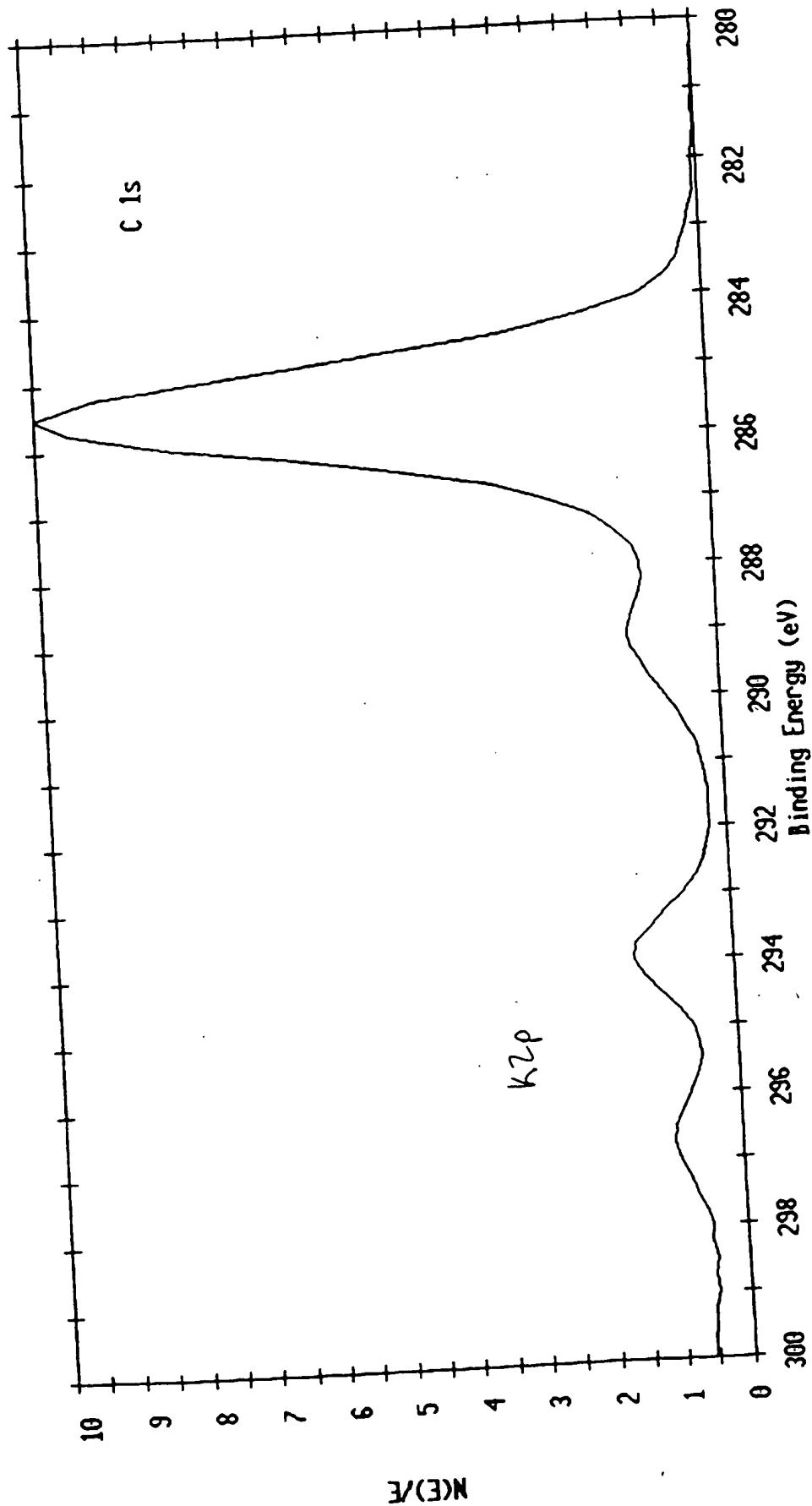
ESCA Survey 1 Nov 94 Angle: 45 degrees Acquisition Time: 29.82 min  
 File: HYDROCA10 SAMPLE A  
 Scale Factor: 29.950 kc/s Offset: 7.175 kc/s Pass Energy: 187.850 eV Aperture: 5 #1 450  $\mu$



ESCA Multiplex 1 Nov 94 Species: Cl Region: 1 Angle: 45 degrees Acquisition Time: 2.09 min

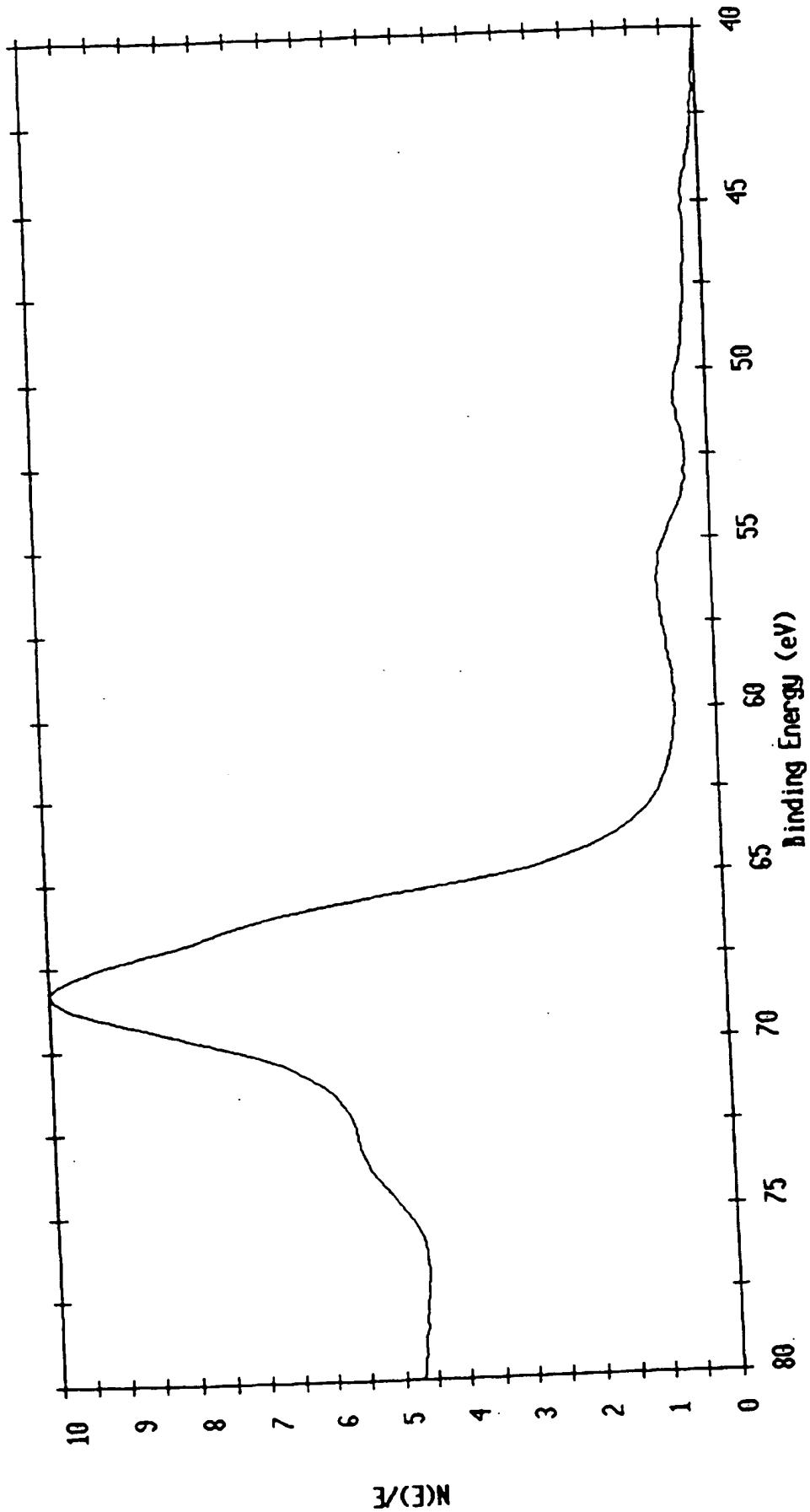
SAMPLE A

File: HYDROCAT11 Offset: 13.449 kc/s Pass Energy: 58.700 eV Aperture: 5 Al 450  $\mu$ m  
Scale Factor: 6.336 kc/s

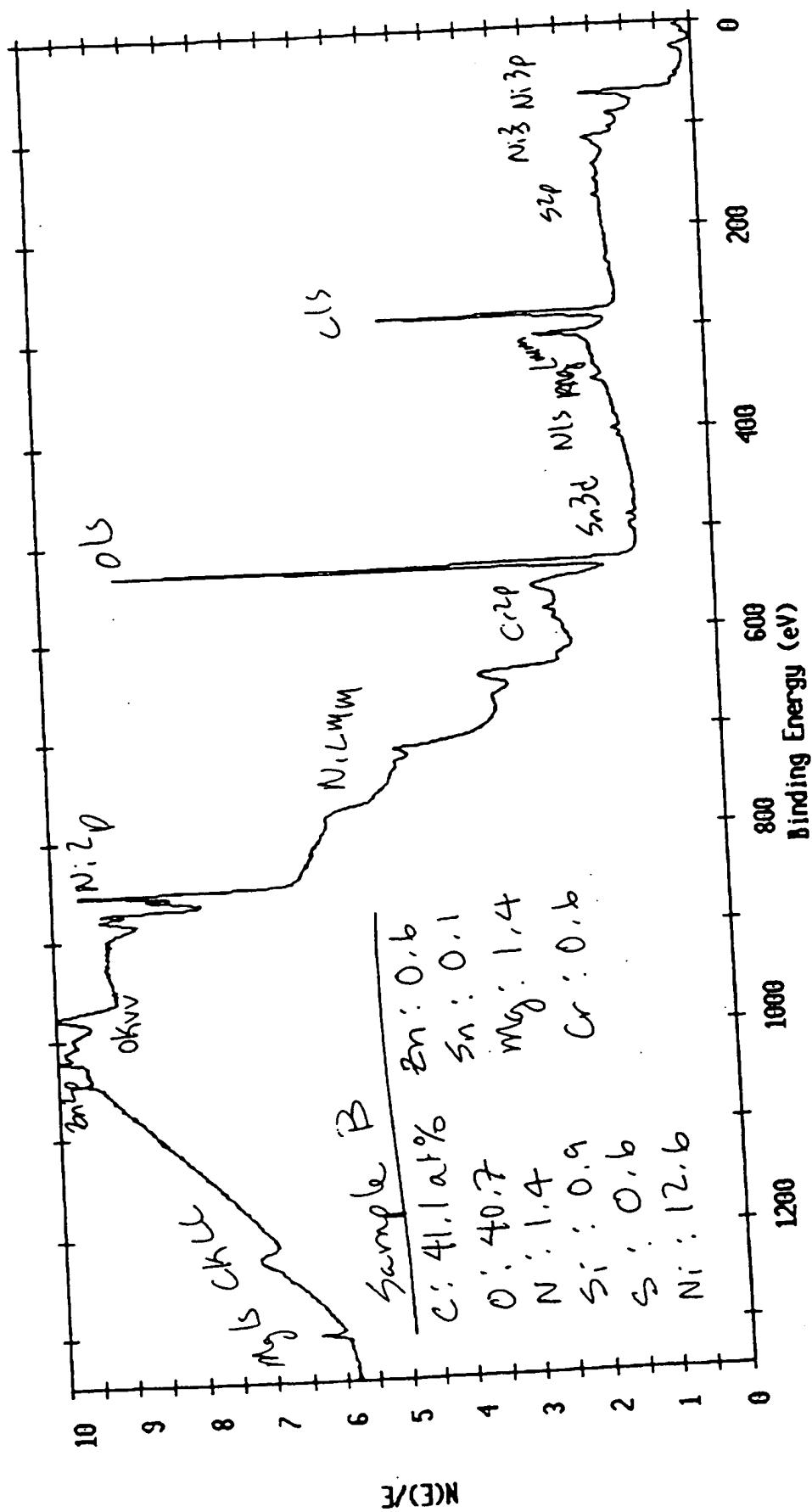


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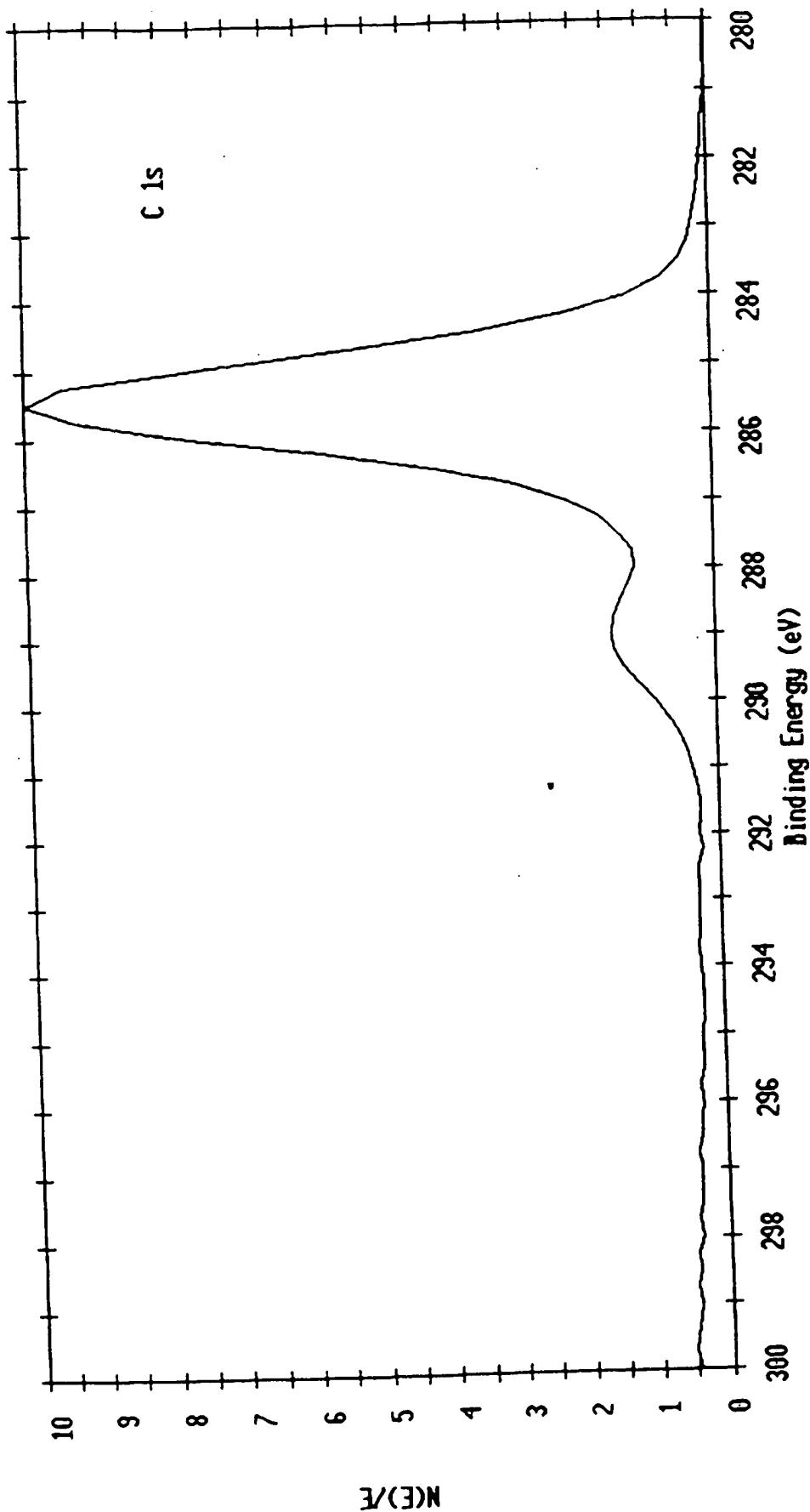
ESCA Multiplex 1 Nov 94 Species: Fe3 Region: 2 Angle: 45 degrees Acquisition Time: 116.46 min  
File: HYDROCAT11 SAMPLE A  
Scale Factor: 1.290 kc/s Offset: 3.150 kc/s Pass Energy: 58.700 eV Aperture: 5 Al 450  $\mu$



ESCA Survey 1 Nov 94 Angle: 45 degrees Acquisition Time: 29.82 min  
 File: HYDROCAT20 SAMPLE B  
 Scale Factor: 30.190 kcps Offset: 6.971 kcps Pass Energy: 187.850 eV Aperture: 5 Al 450 W



⑥  
ESCA Multiplex 1 Nov 94 Species: C1 Region: 1 Angle: 45 degrees Acquisition Time: 2.09 min  
File: HYDROCAT21 SAMPLE B  
Scale Factor: 4.695 kc/s Offset: 12.191 kc/s Pass Energy: 58.700 eV Aperture: 5 A1 450  $\mu$



11/03/94

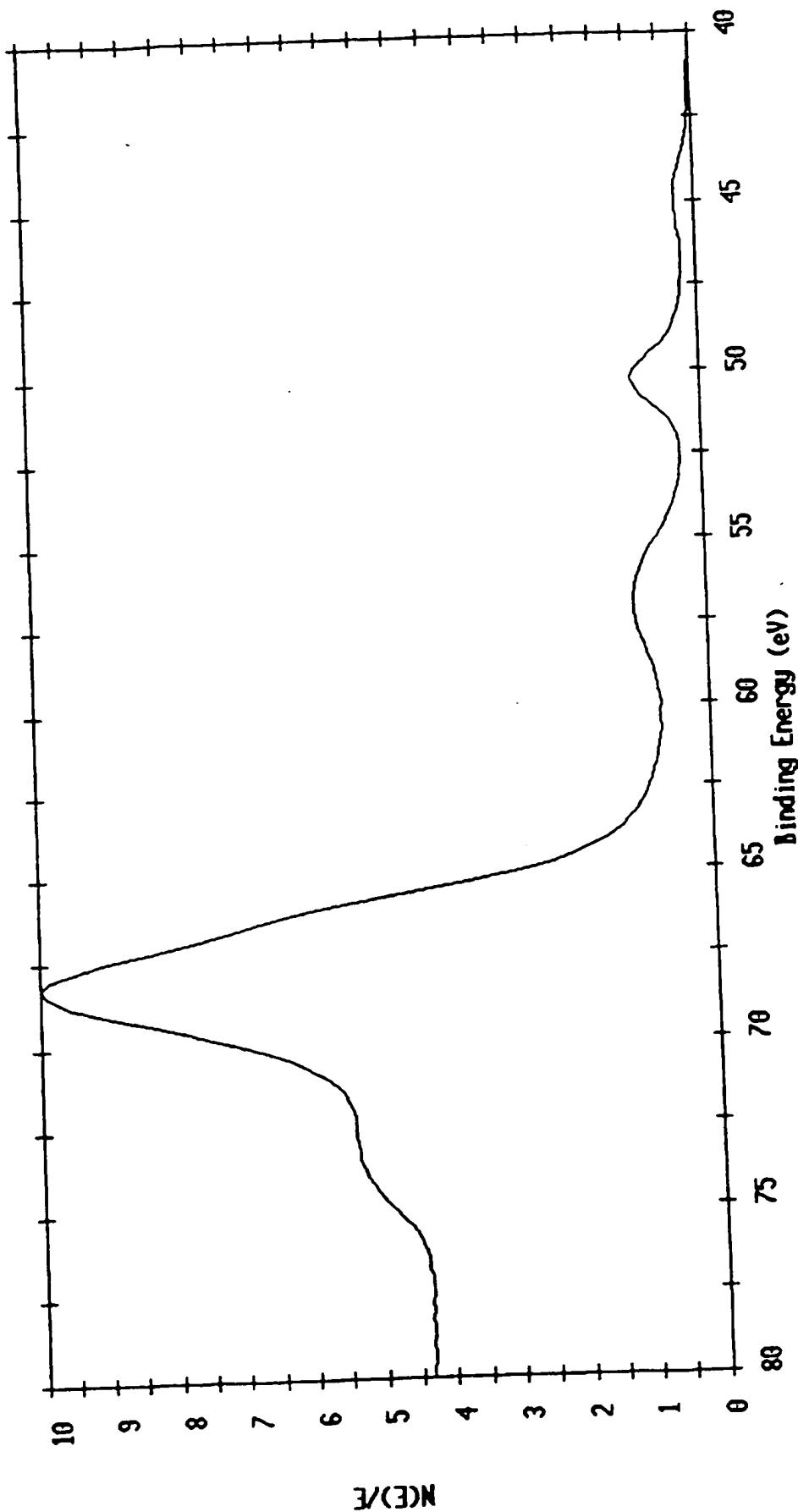
17:29

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007/007

ESCA Multiplex 1 Nov 94 Species: Fe3 Region: 2 Angle: 45 degrees Acquisition Time: 116.46 min  
File: HYDROCAT21 SAMPLE B  
Scale Factor: 1.536 kc/s Offset: 2.987 kc/s Pass Energy: 58.700 eV Aperture: 5 Al 450 W



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